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BEFORE THE

FEDERAL COMMUNICATIONS COMMISSION

WASHINGTON, D.C. 20554

In the Matter of	)	
	)	
AMENDMENT OF PARTS 2 AND 15 OF THE COMMISSION'S RULES TO FURTHER ENSURE THAT SCANNING RECEIVERS DO NOT RECEIVE CELLULAR RADIO SIGNALS	)	ET DOCKET NO. 98-76 RM-9022

To: The Commission

REPLY COMMENTS OF YAESU MUSEN CO., LTD.

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SUMMARY

Yaesu Musen Co., Ltd. and its subsidiary Yaesu USA, a manufacturer of communications equipment used by licensed Amateur Radio Operators and Short-Wave Listeners, herein file Reply Comments on the *Notice of Proposed Rule Making* in ET Docket 98-76. The NPRM proposes to amend Parts 2 and 15 of the Rules to "ensure" the privacy of Cellular-telephone conversations.

As Yaesu has already shown, and as other Commenters have also demonstrated, practically speaking, that attempt to ensure Cellular privacy would be in vain, as there never has been any such privacy, there is none now, and there never will be, especially for conventional analog Cellular (AMPS) transmissions. There are simply too many Cellular-capable analog FM receivers already in circulation. Moreover, the proposed rule amendments would place onerous burdens on the manufacturers of scanning receivers, but would not ensure Cellular privacy, even in receivers redesigned to comply with the NPRM's technical proposals.

Those Commenters supporting the proposed rules have failed to offer a reasoned analysis that justifies the proposed regulations. Those Commenters who have opposed the proposals have shown that the proposed rules will be both ineffective and harmful to a variety of important interests. The record in this proceeding compels regulatory forbearance. The FCC should therefore terminate this proceeding without adopting any of the NPRM's proposals.

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REPLY COMMENTS

Yaesu Musen Co., Ltd. and its domestic subsidiary Yaesu USA (collectively *Yaesu*), a manufacturer of commercial and Amateur Radio transceivers and communications receivers, hereby file Reply Comments in this proceeding.

I. BACKGROUND

1. The Notice of Proposed Rule Making (*NPRM*), 63 Fed. Reg. 31684 (June 10, 1998) proposes, in the name of "ensuring" privacy of Cellular radio telephone calls, to impose:

- (a) substantially more rigorous technical requirements on scanning receivers, including a -38-dB image response to r-f signals in the Cellular band segments and the potting or otherwise permanent sealing of significant portions of scanning receivers; and also
- (b) substantial economic burdens on the manufacturers and purchasers of such devices.

2. Yaesu's Comments showed that the proposed course of action is ill-founded. The proposed rules will no way to "ensure" the privacy of Cellular radio telephone conversations, particularly conventional analog Cellular conversations. Such privacy has never

existed, does not exist now, and would not exist even were the FCC to adopt the new and modified rule provisions that the NPRM advances.

3. Even before the Cellular radio telephone service was but a gleam in the Commission's eye, millions of Cellular-capable consumer-electronic receiving devices were already in the hands of the public. What were they? Garden-variety television sets.... Once the FCC reallocated the largely unused top uhf channels for Cellular radio telephone use, all one had to do to pick up analog Cellular radio telephone conversations was to hook up a halfway-decent receiving antenna and tune around on those former TV channels. And since the inception of the Cellular radio telephone service, many more millions of Cellular-capable consumer-electronic devices have been and continue to be sold. These include: Cellular radio telephones themselves; scanning receivers manufactured prior to April 1994 (which can still lawfully be traded); and Cable Television converter boxes (which can be used with scanning or manually tuned receivers to cover Cellular radio frequencies).

4. So, conventional Cellular radio telephone privacy is a contradiction in terms, and that which does not exist cannot be "ensured" or "further ensured." Even if one states the goal of the proposed new and modified rules in less ambitious terms, *i.e.*, to make it less likely that sensitive conversations will be overheard, the proposed rules will still not be effective. All the while, the proposed rules will place substantial burdens on the manufacturers and purchasers of scanning receivers, for no good purpose.

5. In whatever terms the goal is cast, Yaesu's Comments have demonstrated that the proposed regulations are invalid under classic First-Amendment analyses — particularly

overbreadth and the availability of less restrictive means. In the name of Cellular privacy, the regulations propose to restrict the public's access to, and ability to tune, publicly owned airwaves, access for which the public has totally legitimate purposes: purposes that are totally unrelated to the Cellular radio telephone service. Such a sweeping prohibition on access to publicly owned airwaves is plainly unconstitutional. There are *more effective* ways to make it less likely that sensitive conversations will be overheard. First and foremost, the Commission can and should require Cellular radio telephones to bear exactly the kind of label that Part 15 cordless phones must carry.[1] That way, people will be able to use Cellular radio telephones with full knowledge of their very real limitations. Secondly, the Commission can and should encourage or require Cellular radio telephone service providers and equipment vendors to provide radio telephones with effective encryption, and to inform their subscribers concerning third-party security add-ons for existing phones.

6. Moreover, while the strictest scrutiny under the overbreadth/less-restrictive-means tests form the appropriate Constitutional analysis here, even under a more-forgiving balancing or even a substantive due process (rational-basis) test, the proposed rules fail. The burdens the proposed rules would hoist upon Yaesu and the public so far outweigh any infinitesimal enhancement of nonexistent Cellular privacy as to tilt strongly against their adoption. Moreover, as several of the Commenters point out, there are other, readily available, and far easier means of overhearing analog Cellular communications than those areas on which the

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[1]"Privacy of communications may not be ensured when using this phone." 47 C.F.R. § 15.214(c).

NPRM focuses as to render the entire exercise pointless and unreasonable. Those who wish to tune the Cellular bands, instead of attempting to modify delicate microelectronics, will use home-made frequency converters or off-the-shelf Cable Television converter boxes, or they will use uhf television preamps to recapture suppressed gain in the Cellular radio band segments. It makes no sense to put substantial burdens, as the NPRM proposes, on manufacturers and average citizens alike when the only real and effective solutions lie elsewhere.

7. The substantial majority of the Comments filed in this proceeding confirm points Yaesu has made. The Comments asserting opposing points of view do not persuade otherwise.

II. Synopsis of the Other Comments

A. Comments of the Cellular Interests

8. The Cellular Telecommunications Industry Association, Bell Atlantic Mobile, Inc., and AT&T Wireless Services, Inc. (collectively, the *Cellular Interests*) broadly support the Commission's proposed rules and express pleasure that the Commission wants to close any loop-holes in the current rules. Without providing any reasoned analysis, the Cellular Interests support the proposed -38-dB image-response and potting/sealing requirements. They also urge the FCC to adopt the definition of "scanning receiver" used in a statute passed earlier this year to address the issue of cellular cloning and toll fraud. Without elaboration, the CTIA asserts that this will obviate the need for special treatment of Cellular radio telephones themselves, which (as the NPRM observes) are capable of receiving Cellular conversations — if you "know the code." The Cellular Interests also favor a rapid (90-day) phase-in of the rules the NPRM proposes.

B. Comments Opposing the NPRM's Proposals

9. The American Radio Relay League (*ARRL*), the national association of licensed Radio Amateurs, generally advances positions consistent with those Yaesu has set forth in its own Comments. ARRL believes the current regulations are adequate to ensure Cellular privacy and that the potting requirement would be overkill. ARRL also does not oppose the -38-dB image-rejection standard, but requests that Amateur transceivers be exempt from direct-pickup testing (for example, in a TEM cell), and requests that the image-rejection standard be more precisely defined so as to use the receiver's best sensitivity as its reference. The League also objects to proposed restrictions on frequency converters and manually tuned receivers, and claims that Amateur Radio transceivers should be exempt from the scanning rules if cellular transceivers are also. The ARRL opposes restrictions on sales of test equipment to Amateurs.

10. Several Electrical and Industrial engineers (e.g., David Alkire Smith, Jacob Brodsky, Michael Ardai), as well as several radio hobbyists, echo themes that Yaesu's Comments advance. Mr Smith attacks the Uniden (-38-dB image-response) proposal as a marketing ploy, and states the potting requirement is unworkable and would make radio receivers throwaway devices. Mr. Brodsky, both an Electrical Engineer and an Amateur Radio Operator, attacks the NPRM as the product of the "Flat Earth Society" and as impractical, ineffective, and cumbersome. Mr. Brodsky asserts there is no such thing as radio privacy, and attacks most of the proposals as vague (but does not object to the -38-dB image-rejection requirement). However, Mr. Brodsky states that the potting requirement would cause quality-control problems. Mr. Ardai, both an Engineer and an Amateur Extra Class licensee, opposes the

NPRM as placing the burden on the wrong people, and as doing little to ensure Cellular privacy. Mr. Ardai points out that the Commission should require encryption if it is interested in fostering privacy, and that conversion to digital modulation will make the NPRM's proposals unneeded. Mr. Ardai opposes the potting requirement, stating it will make radios impossible to repair. He also opposes a mandatory image-rejection specification.

11. Wayne Blackburn, an electronic technician and licensed Private Investigator, needs scanners to conduct legitimate searches for illegal bugging devices. Mr. Blackburn points out that the proposed potting requirement would put radio repair shops out of business.

III. YAESU'S RESPONSE

A. THE CONSTITUTIONAL ISSUE

12. None of the other Commenters, to Yaesu's knowledge, have provided a Constitutional analysis of the proposed rules. Yaesu reiterates its position, advanced in Yaesu's Comments, that the proposed rules are invalid under standard First-Amendment analysis as regards overbreadth and less restrictive means. Just last year, the Supreme Court declared the Communications Decency Act (*CDA*) unconstitutional because the Government had not established that lesser restrictions on public access to channels of communication (*i.e.*, burdens on protected speech) would be at least as effective as the CDA's provisions in achieving the CDA's legitimate purposes. Reno v. ACLU, 117 S.Ct. 2329, 138 L.Ed.2d 874 (1997), citing, Sable Communications of Cal., Inc. v. FCC, 492 U.S. 115, 126. Just so here, the proposed rules fail the less-restrictive-means test.

13. The proposed rules seek, among other things:

- to require manufacturers to make scanning receivers unmodifiable, and therefore largely irreparable, even though repairs, and many modifications, can have wholly legitimate purposes; and

- to require manufacturers to make scanning receivers less sensitive to radio-frequency energy in the Cellular band segments, even though there are wholly legitimate purposes, including licensees' attempts to ensure compliance with FCC spurious-emissions requirements, and experimenters' efforts to engage in lawful communications under Part 15 of the rules.

The FCC's stated goal is to ensure the privacy of Cellular communications. Yaesu has already shown that goal is unrealizable.[2] What may be practically attainable is reducing the likelihood of Cellular conversants' unpleasant surprises due to the real lack of privacy of unencrypted analog communications. Assuming *arguendo* that is a legitimate State interest, there are wholly *more effective* means of achieving that goal than what the NPRM proposes. And those wholly more effective means won't burden the public's First Amendment rights to access the public airwaves.

14. For example, such more effective means include requiring Cellular phones to bear labels warning their users that third parties might overhear their conversations.[3] This way, the public knows the truth, especially about unencrypted, analog communications. The public can carry on their more sensitive conversations over wired telephones, or over wireless phones with such built-in security features as their purchasers see fit to acquire. In that regard, such more

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[2]CTIA itself admits that, "PCS does hold decisive advantages [over analog Cellular] when it comes [to] competitive prices and privacy." *http://www.wow-com.com/professional/index.cfm, reporting on a survey of 477 cellular phone and 523 PCS users by Peter D. Hart Research Associates on the topic " Competition in the Wireless Marketplace."*

[3]The Commission requires just such labels for Part 15 cordless phones. See n.1.

effective means include encouraging or mandating that phones incorporate appropriate levels of encryption, and that service providers fairly apprise their actual and prospective customers as to the degree of security the phones offer.

15. While certain parties' desires for privacy are wholly understandable, the cost of achieving those goals cannot be the suppression among the public at large of fundamental liberties. For example, in Martin v. Struthers, 319 U.S. 141, 63 S.Ct. 862, 87 L.Ed 1313 (1943), the Supreme Court struck down a city ordinance forbidding knocking on a door or ringing a doorbell for the purpose of delivering handbills. The ordinance, the Court held, forbade not just communications that were annoying, or invasive of privacy, or associated with a criminal purpose, but also those that home owners might welcome. Similarly, in Lamont v. Postmaster General, 381 U.S. 301, 85 S.Ct. 1493, 12 L.Ed. 398 (1956), the Court struck down a statute permitting postal delivery of communist propaganda from abroad only if the addressee specifically requested that the material be delivered. The statute, while it may have shielded many from having to dispose of what they might deem undesired trash, impermissibly impeded not just speech by the speaker, but also delivery even to a willing recipient.

16. In the Cellular context, many subscribers might prefer privacy. Those who do can pay for encrypted and digital phones. Then again, many who might prefer privacy in one context might not want it in another.[4] Yet others, for simple economic reasons, might opt for lower-cost

[4]A salesperson making a cold-shot sales pitch via an analog Cellular radio telephone might have no objection at all that others happen upon the sales pitch in the course of using a scanner for another purpose.

Another very topical example relates to the difficulties and limitations associated with

"party line," in-the-clear analog service. Each set of subscribers would be making intelligent economic choices. Allowing informed consumers and the laws of economics to produce the desired result works far better than the Constitutionally invalid approach of walling off 50 MHz of spectrum from the American people at large, a good number of whom have wholly legitimate purposes to tune the Cellular bands.[5] In addition to its fatal First-Amendment flaws, the proposed regulatory approach raises a significant question of whether it is a Bill of Attainder in violation of Article I, § 9, cl. 3.

B. Even Apart From The Most Rigorous Constitutional Considerations, Regulatory Forbearance is Warranted Here.

17. AT&T Wireless claims that, "From a wireless carrier's perspective, maintaining privacy and security of wireless communications is critical both to subscribers who use such services and to the continued growth of the wireless industry." As we have shown above, such

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attempting to report an emergency via a Cellular radio telephone, a matter both of current concern by the FCC (in CC Docket No. 94-102) and discussed in recent days in both the general and trade press. One attempting to place an emergency call via Cellular radio telephone might very much indeed welcome the assistance of a Good-Samaritan Radio Amateur who, in the course of using a scanner for another purpose, happens to pick up and can help public-safety authorities locate a party in distress. This is the other side of the coin from what Bell Atlantic Mobile hyperbolically terms the "continuing threat to personal security" from third-party and perhaps unintended reception of Cellular radio transmissions.

[5]Even when the Government's ends are legitimate and highly important, the same analysis applies. "[E]ven though the governmental purpose be legitimate and substantial, that purpose cannot be pursued by means that broadly stifle fundamental personal liberties when the end can be more narrowly achieved. The breadth of legislative abridgment must be viewed in the light of less drastic means for achieving the same basic purpose." Shelton v. Tucker, 364 U.S. 479, 81 S.Ct. 247, 5 L.Ed.2d 231 (1960).

considerations, even if valid, cannot outweigh the Constitutional rights of the public at large. Moreover, overlooking the questionable assertion that whether privacy of Cellular — especially analog Cellular — communications can be "maintained," AT&T provides no basis to back up its blanket assertion that trying to protect AMPS signals from reception by third parties is critical to the industry and its subscribers. In fact, the Cellular carriers' own words and deeds undercut their position. Cellular carriers are in the process of shifting their networks to digital transmission formats for increased spectral efficiency, i.e., to permit "continued growth" beyond what analog Cellular radio can provide.[6]

18. As just two (timely) examples of this trend, consider that:

- *Wireless Today* for July 23, 1998, contains a lead story about AT&T's plans to continue the shift from AMPS to TDMA digital service under the headline "AT&T Moves Full Speed Ahead On Analog-To-TDMA Migration ."

and that

- on July 8, 1998, Bell Atlantic Mobile issued a press release, available though BAM's Web Site at *http://www.bam.com/press.htm,* entitled "Customers Choose Digital Service as Bell Atlantic Mobile Expands Network," which reads in pertinent part as follows:

> **BEDMINSTER, NJ** – Bell Atlantic Mobile today announced that nearly one quarter of all new customers signing up for wireless service opt for its high-quality digital service – DigitalChoice℠. As a result, digital now accounts for close to 20 percent of the usage on the company's network. This is due to the company's aggressive digital network build-out and pricing strategy, which has proven successful in making DigitalChoice appealing to a wide range of customers.
>
> Bell Atlantic Mobile has invested over $300 million in digital network expansion since the start of 1998 to meet the record demand for affordable digital service – making DigitalChoice even more attractive for customers to purchase and use, with digital coverage extending to more than 80 percent of Bell Atlantic Mobile's POPs (population served).
>
> Bell Atlantic Mobile, with 80 percent POPs coverage, ranks well above the cellular industry

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[6]TDMA systems offer three times the channel-loading capacity of analog Cellular systems. CDMA claims up to a 20:1 channel-loading advantage.

> average of 50 percent POPs coverage, according to a recent study by the Yankee Group, an information technology market research firm.
>
> The company launched digital service in all its major markets in 1997 and has quickly expanded the high-quality network during the first half of this year. In fact, the rollout of digital service during the past six months in such places as upstate New York, the eastern shores of Delaware, Maryland, and Virginia, and the New Jersey shore, enables customers to enjoy for the first time the use of DigitalChoice in these heavily-traveled summer locales.
>
> Bell Atlantic Mobile is an industry trend-setter in introducing pricing for digital service that makes the technology accessible to all types of customers. In March, the company made significant price reductions, and eliminated landline charges and peak/off-peak distinctions. The company also introduced new consumer-friendly options for digital service, including a digital phone rental option, an all-you-can-use mobile-to-mobile pricing plan, and a traveler calling option that allows customers to use their digital phone at a reduced uniform rate of 50-cents anywhere in the U.S., by paying a flat fee of $5 a month.
>
> "We built an expansive, high-quality digital network and we want our customers to have the full advantage of this new technology," said Jack Plating, Bell Atlantic Mobile's executive vice president and chief operating officer. "With added value and benefits like extensive roaming capabilities and pricing options for everyone, now is the perfect time for customers to go digital."
>
> Bell Atlantic Mobile's DigitalChoice delivers increased call reliability, greater voice clarity, ***enhanced privacy*** and an array of advanced features [emphasis added]."

The switch from analog to digital on the Cellular Band is accelerating as the demand for wireless access increases (while the allotted Cellular spectrum remains constant), and as new integrated circuits make digital even more affordable and capable of greater performance.[7]

19. To an analog communications receiver, digital Cellular signals sound like noise bursts, or the rushing sound generated by personal-computer modems. The very format itself provides a degree of privacy utterly lacking in analog Cellular, as Mr. Ardai correctly observes. There is no need to impose onerous new requirements on the manufacturers of communications receivers when less-restrictive requirements and marketplace forces will accomplish the desired

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[7]See, as just one indicator of the technological advances, *http://www.gsmdata.com/digital.htm.*

goal, as Yaesu and Mr. Ardai have pointed out.[8]

20. Time and time again, even where regulation has not raised thorny Constitutional problems, the FCC has properly and substantially relied on competitive market forces to advance the public interest. Each time, the FCC has recognized that competition is far more effective and desirable than the blunt tool of regulatory fiat.[9] This is particularly true in the instant situation, where, as Yaesu has shown, the proposed rules will do nothing to achieve the intended goals, but rather — in the futile attempt — will cause harm to many, and to the Constitution itself.

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[8] The Cellular Interests' statements also completely disregard the rapid growth of PCS, which offers infinitely greater privacy than analog Cellular communications. PCS carrier Aerial Communications, Inc.quotes a study conducted by the Personal Communications Industry Association (PCIA) to the effect that, "... the wireless market will grow from about 30 million subscribers today to nearly 65 million in the year 2000. The organization forecasts that PCS will grow from just a handful of customers today to 15 million subscribers by year 2000 and nearly 40 million by 2005." *http://www.aerial1.com/minneapolis/ca1b11.htm.* As CTIA admits, PCS's digital format gives it a compelling advantage over (analog) Cellular as regards privacy. See n. 1.

[9] *See, e.g., Deregulation of Radio, 84 FCC 2d 797 (1981), aff'd sub nom. Office of Communications of the United Church of Christ v. FCC, 707 F.2d 1413 (D.C. Cir. 1983), remanded sub nom. Office of Communications of the United Church of Christ v. FCC, 779 F.2d 702 (D.C. Cir. 1985), responsive Memorandum Opinion and Order, 104 FCC 2d 505 (1986); Revision of Programming and Commercialization Policies, Ascertainment Requirements, and Program Log Requirements for Commercial Television Stations, 98 FCC 2d 1076 (1984), recon. denied, 104 FCC 2d 357 (1986), aff'd in part and remended in part sub nom. Action for Children's Television v. FCC, 821 F.2d 741 (D.C. Cir. 1987); Policy and Rules Concerning Rates for Competitive Common Carrier Services and Facilities Authorization Therefor, Notice of Inquiry and Proposed Rulemaking, 77 FCC 2d 308 (1979); First Report and Order, 85 FCC 2d 1 (1980); Further Notice of Proposed Rulemaking, 84 FCC 2d 445 (1981); Second Report and Order, 91 FCC 2d 59 (1982), recon. denied, 93 FCC 2d 54 (1983); Second Further Notice of Proposed Rulemaking, 47 Fed. Reg. 17308 (April 22, 1982); Third Report and Order, 48 Fed. Reg. 46791 (Oct. 14, 1983); Third Further Notice of Proposed Rulemaking, 47 Fed. Reg. 28292 (June 21, 1983); Fourth Report and Order, 95 FCC 2d 554 (1983); Fourth Further Notice of Proposed Rulemaking, 49 Fed. Reg. 11856 (March 28, 1984); Fifth Report and Order, 98 FCC 2d 1191 (1984); Sixth Report and Order, 99 FCC 3d 1929, rev'd sub nom. MCI Telecommunications Corp. v. FCC, 765 F.2d 1186 (D.C. Cir. 1985*

C. The Proposed Image-Rejection Requirement Lacks Any Evidentiary Support

21. Yaesu pointed out in its Comments, and the NPRM admits, that the proposed requirement for a -38-dB image response for scanning receivers utterly lacks evidentiary support. The Comments do nothing to rectify this defect. The Cellular Interests' filing support the proposed requirement but provide no reasoned analysis to justify the proposal. By contrast, Yaesu's Comments show, through straightforward mathematical analysis, that the proposal would be ineffective. Yaesu's Comments also showed that mandating -38-dB of image response is easily circumvented through the use of widely available uhf television preamplifiers.

22. Yaesu agrees with David Alkire Smith's observation that this proposal, advanced by Uniden, "... smacks of being nothing more than [a] marketing ploy." Yaesu also agrees with electronic hobbyist Chuck Meyer, who makes the valid point that image tuning is not a realistic way to monitor Cellular conversations, because image tuning usually does not cover the full Cellular band segments and because the channel bandwidths (of Cellular signals and of the receiver's i-f stages when the receivers are tuned to image frequencies) often differ. Yaesu completely agrees with Electrical Engineer Michael Ardai's and Mr. Meyer's observations that image rejection is a matter best left to marketplace forces and is an inappropriate subject of federal regulation. And while Mr. Smith states that the proposed image-response requirement would assist manufacturers in meeting Part 15 incidental-radiation limits, there are other, more cost-effective ways of meeting those FCC requirements, such as simple foil shields.

23. The proposed image-response requirement lacks adequate evidentiary support. Therefore, the Commission cannot impose it. "[D]ecisions unsupported by relevant data are

simply arbitrary,"[10] and not the stuff of which valid federal regulations are made.

D. The Proposed Potting Requirement Also Lacks Justification

24. The ARRL, Mr. Meyer, Mr. Blackburn, Mr. Brodsky, and Mr. Smith all raise significant problems with the potting/encasing requirement. Mr. Brodsky correctly points out that potting is not as inexpensive as one might think. (So does the ARRL.) Mr. Brodsky also points out that potting often detunes r-f circuits and can lead to substantial quality-control problems. Mr. Smith makes the valid point, as Yaesu has done, that the proposed requirement would render scanning receivers throwaway devices and is "not workable." Messrs. Meyer and Blackburn speak to the repair and waste-stream issues, also. The ARRL correctly points out that requiring Amateur equipment to be irreparable and unmodifiable is antithetical to the core, experimental nature of the Amateur Radio Service.

E. Other Matters

25. The ARRL and Mr. Brodsky properly point out the significant burden that requiring testing in an anechoic or TEM chamber would place on receiver manufacturers, and indirectly, on Amateurs and other users of communications receivers.

26. Mr. Brodsky offers the cogent observation that Cable TV tuning boxes offer an easy way to tune Cellular band segments. Yet the NPRM says nothing about Cable TV boxes.

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[10] Cross-Sound Ferry Services, Inc. v. ICC, 738 F.2d 481, 484 (D.C. Cir. 1984).

Moreover, the Cellular Interests really have nothing to say about the cellular-reception capabilities of Cellular radio telephones themselves. While Mr. Brodsky asserts that it is cumbersome to use Cellular telephones for this purpose, that is an overgeneralization. As Mr. Damien Thorne has pointed out in the June 1994 magazine *Nuts and Volts*, in an article entitled *Cellular Test Mode Secrets:The Scanner Within Your Phone*, accessing test modes to unmute the audio squelch and to direct the phone's frequency synthesizer (tuning circuit) to particular channels is simply a matter of entering the right sequence of keypad entries or issuing the appropriate commands to the Cellular radio phone via its test-set data connector. One wanting to use a Cellular radio phone in this way could easily automate the process using a personal computer and off-the-shelf logic circuits.

27. Yaesu completely concurs with the ARRL that the exception that purports to take Cellular radio telephones out from the purview of Section 15.121 applies equally to Amateur transceivers that include a scanning function. By the same logic, the exception applies to commercial radio equipment used in land-mobile and other radio services. There is no rational basis for treating such devices any differently than Cellular radiotelephones. Melody Music, Inc. v. FCC, 345 F.2d 730 (D.C. Cir. 1965); Garrett v. FCC, 513 F.2d 1056, 1060 (D.C. Cir. 1975); Democratic Union Organizing Committee v. NLRB, 603 F.2d 862, 872 (D.C. Cir. 1978); Herbert Harvey, Inc. v. NLRB, 424 F.2d 770, 780 (1969); Burkinskas v. NLRB, 357 F.2d 822, 827 (1966). See also, Columbia Broadcasting System, Inc. v. FCC, 454 F.2d 1018, 1026 (1971); Indiana Broadcasting Corp. v. FCC, 407 F.2d 681, 684-85 (1968).

28. Mr. Brodsky has made the very valid point (as has Yaesu) that a scanning receiver makes a valuable piece of test equipment for Amateur Radio licensees and other electronics

experimenters. Mr. Blackburn points out that he uses scanning receivers to detect illegally planted bugs. Were the FCC to adopt the NPRM's proposals, one very predictable side-effect would be to stimulate the manufacture of bugging devices that transmit in the Cellular band segments, where they would be harder to discover.

29. The Cellular Interests, by contrast, seek to choke off the general public's access to radio-frequency test equipment. In practice, the Cellular Interests' position, if adopted, would work an unconstitutional infringement on individuals' attempts to educate themselves and to prepare themselves for careers in Electrical Engineering and communications technology.[11] It is particularly ironic and woefully short-sighted for the Cellular industry to try to stifle individual and societal technological advancements. After all, that industry is deeply indebted to the pioneering efforts of Radio Amateurs and other experimenters. It is an industry that is also heavily dependent on the overall economic health of country. The Cellular Interests' approach also runs directly counter to the United States's efforts to retain its technological lead in the technology arena, which is critical to the economic health of the nation.[12]

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[11]For example, AT&T would limit access to test equipment to those pursuing a "bona fide research or grant program or academic undertaking." Such language is fatally vague. What might its effect be on a future Edison, who might lack the means to attend University, but who has a keen interest in venturing into uncharted technological waters using his own equipment?

[12] See, for example, *http://www.tiaonline.org/resources/1997_summary.html:*

> U.S. Telecom Equipment Industry Registered $5.8 Billion Trade Surplus in 1997
> U.S. factory sales of telecommunications equipment reached $64.8 billion in 1997, a 7 percent increase over 1996, according to statistics released by the Telecommunications Industry Association (TIA). The 1997 trade surplus in telecom equipment grew to $5.8 billion, a 62 percent increase in the trade surplus over 1996, with exports registering a 23 percent increase to $20.8 billion

30. Yaesu reiterates its position that, assuming, in the worst case, that the FCC goes ahead and adopts the technical rules discussed above as proposed, it must grandfather all existing certificated equipment and provide a far more gradual phase-in than the abrupt 90-day implementation period that the NPRM proposes. The 90-day proposal is draconian in its brevity and totally unwarranted. Moreover, with respect to existing, certificated scanning receivers, it would violate procedural due process.

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and imports reflecting a growth of 12 percent to $14.9 billion.

These figures represent the fourth straight year that U.S. factory sales of telecom equipment continued phenomenal growth reflecting the excellent health of the telecommunications industry," commented TIA President Matthew J. Flanigan.

The boom in the industry may be attributed to convergence technologies which allow individuals and businesses to benefit from the increasing interoperability of communications equipment. Also, the tremendous growth in the export market is a result of the deregulated international markets which look to U.S. manufacturers for cutting-edge communications technology products.

See also *http://www.tiaonline.org/pubs/press_releases/1998/98-70.html:*

U.S. Exports of Telecom Equipment Top $5 Billion

According to statistics released by the Telecommunications Industry Association (TIA), U.S. exports of telecommunications equipment for the first quarter of 1998 totaled over $5 billion, a 16 percent increase over the same period in 1997. While communications satellites/reception apparatus represents the largest market segment at nearly $1.3 billion, the greatest increases were in cordless telephones and telegraphic apparatus and parts, which jumped 59 percent and 43 percent, respectively.

TIA President Matthew J. Flanigan commented, "The Asian financial crisis notwithstanding, the overall world marketplace is strong. With first quarter exports growing 16 percent over last year, the United States remains the leading communications equipment exporter."

31. Requiring all certificated scanning receivers to come into compliance within 90 days would rise to the level of revoking their certifications, effective 90 days from the effective date of such order. This the Commission cannot accomplish by *diktat* in rule making. Section 2.939(b) mandates that, "[r]evocation of an equipment authorization shall be made in the same manner as revocation of radio station licenses," *i.e.*, only after a full evidentiary hearing. Furthermore, given the substantial changes that the proposed rules would force upon existing and to-be-introduced designs, the 90-day limit is totally inconsistent with past precedent and the requirements of § 2.939(c):

> The Commission may withdraw any equipment authorization in the event of changes in its technical standards. The procedure to be followed will be set forth in the order promulgating such new technical standards (after appropriate rulemaking proceedings) and will provide a suitable amortization period for equipment in the hands of users and in the manufacturing process."

V. CONCLUSION

32. For all the above reasons, the Commission should terminate this proceeding without adopting the proposed rules set forth in the Notice of Proposed Rule Making.

Respectfully submitted,

YAESU MUSEN CO., LTD.

By _____
John J. McVeigh
Its Counsel

Date: July 27, 1998

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31. Requiring all certificated scanning receivers to come into compliance within 90 days would rise to the level of revoking their certifications, effective 90 days from the effective date of such order. This the Commission cannot accomplish by *diktat* in rule making. Section 2.939(b) mandates that, "[r]evocation of an equipment authorization shall be made in the same manner as revocation of radio station licenses," *i.e.*, only after a full evidentiary hearing. Furthermore, given the substantial changes that the proposed rules would force upon existing and to-be-introduced designs, the 90-day limit is totally inconsistent with past precedent and the requirements of § 2.939(c):

> The Commission may withdraw any equipment authorization in the event of changes in its technical standards. The procedure to be followed will be set forth in the order promulgating such new technical standards (after appropriate rulemaking proceedings) and will provide a suitable amortization period for equipment in the hands of users and in the manufacturing process."

IV. Conclusion

32. For all the above reasons, the Commission should terminate this proceeding without adopting the proposed rules set forth in the Notice of Proposed Rule Making.

Respectfully submitted,

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By_____
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Date: July 27, 1998

ATTACHMENT A

CELLULAR TEST MODE SECRETS

The Scanner Within Your Phone

by Damien Thorn

The secret diagnostic mode and test commands engineered into many cellular phones has managed to capture quite a bit of attention recently. Such debugging tools have never been a secret to knowledgeable cellular technicians, but these tools now have a wider, enthusiastic audience.

Some of these functions have been demonstrated before congressional subcommittees and vaguely described in many magazines and newspapers as an intriguing new development on the cellular frontier.

It should really come as no surprise to those of us familiar with synthesized radios to discover the inherent ability to manipulate such hardware. Most people possessing an amateur radio callsign are at least peripherally aware that a number of ham transceivers can be coaxed into performing neat tricks with a simple modification or a few undocumented keystrokes.

And so it goes with cellular phones. The correct sequence of keystrokes is often enough to open up an interesting mode where the hardware directly responds to your every command.

CELLULAR SCANNING

The ability to unmute the speaker in a cellular phone to hear the audio being received, and the ability to load the transceiver's frequency synthesizer with a given cellular channel seems to be considered the "coolest" function available in debug mode. These two commands essentially allow a phone to become a cellular-capable receiver. Even a manual scanner of sorts.

Of course, much of the interest has been generated because cellular-capable scanning and continuous coverage receivers are now illegal to manufacture in (or import to) the United States. This ban took effect April 26th of this year thanks to a provision tucked away in legislation that primarily concerned itself with the regulation of "900" number toll services.

Since it is perfectly legal for us to own cellular-capable scanning radios, and for distributors to sell their existing stock of such devices, there is nothing inherently illegal in using a cellular phone to monitor cellular frequencies when such monitoring is consistent with the provisions of the Electronic Communications Privacy Act (ECPA) of 1986. When employing these modes for purposes other than testing, avoid "intercepting" calls without the consent of at least one party to the conversation, or you will violate this sacred statute and be subject to arrest by the FBI.

To both satisfy the curiosity of many people who have written to request more information about these test modes, and to highlight the paradox of the cellular-capable scanner ban, let's document some of the phones available with these command sets tucked neatly away in their software sub-basement.

While the information that follows is limited to the commands required to activate the audio section and program given frequencies into the receiver, these are by no means the only test functions available. Most of the diagnostic commands for the popular Oki 900 pocket phone were listed in our article "Secrets of the Oki 900" (N&V, Dec. '93).

Aside from Oki, Motorola is the other manufacturer whose phones have generated a large amount of interest. Whether your curiosity is of a professional nature, or you've been itching to tinker with the hardware you paid good money to buy, we hope you'll be pleased with the second half of this article which focuses in detail on the entire complement of commands available in the transceivers produced by Motorola.

UNDERSTANDING TEST MODE

The test and diagnostic [illegible] available in cellular [illegible] occurred by design, deliberately written into the phone's computer programs that operate the phone's electronics. While some critics have expressed the opinion that these commands may have been exploited by hackers on the programming team designing such software, this is a highly unlikely scenario.

From the beginning — before hand-set programmability was introduced — most cellular phones could be manually controlled. Back in these early days, the mobile telephone number (MIN) and other parameters had to be burned directly to an EPROM with an external programmer. Once programmed, the chip was socketed inside the phone. The format of the data contained within this chip pretty much adhered to an industry-defined standard.

Another industry-defined protocol of the period was the AMPS, or Advanced Mobile Telephone Service standard detailing the interface and cabling between the transceiver unit (which was usually mounted in the trunk of a vehicle) and the handset/control-head located in the passenger compartment.

Such interconnection was accomplished with a rather thick cable adhering to the AMPS spec as promulgated by Bellcore prior to divestiture and the court-ordered breakup of the Bell System monopoly. The old AMPS standard also included provisions for manual testing of various subsystems within the phone to diagnose problems or align audio and RF sections. Such testing was accomplished with a specially designed interface box and computer software, using a bulky cable and various adapters for different transceivers.

During these initial years, there weren't that many cellular hardware manufacturers, and to give you a better feel for how Jurassic this equipment was by today's standards, one of the more popular test mode set-ups ran on a Commodore-64 personal computer.

Manufacturers gradually moved away from the AMPS bus standard. As technology advanced, phones were re-engineered to use a serial data interface or some proprietary hybrid to control the transceiver. This eliminated an assortment of control circuitry and a number of the wires that previously interconnected the control head and transceiver, thus bringing down the manufacturing cost.

Since the trusty AMPS test rig was now useless for in-shop diagnostics, most manufacturers included a manual test mode in their operating software. Although some adapter or external piece of hardware may still have been required to access the test mode, the

OPEN SESAME

To access the [illegible] referred to as "[illegible]" words. Because these terms are used to describe the unique strings of digits that protect computer accounts, alarm systems, and things of that nature, it is important to clarify the role of these keystroke sequences.

The series of digits that causes a cellular phone to execute a test routine is not a trade secret, "code" or "password" in the confidential sense. Such sequences are provided by the manufacturer to allow servicing, and are the same from one phone to the next on any given model.

Never intended to be a big secret, the sequences were designed to prevent the end user from accidentally entering the diagnostic mode. Most people would be quite disturbed to suddenly hear another cellular call blaring from the handset after a phony dialing attempt, and then see arcane messages flashing across the LCD display. It's not difficult to imagine the chaos that would be caused by someone driving around town with their phone in test mode with the carrier on, oblivious to the fact that the accidental transmission was causing calls to be dropped by the cellular system left and right.

As we dive into cellular test modes, be aware that the list of phones provided here is not all-inclusive. It is not necessarily accurate either, as the data has been compiled from a number of sources and was impossible to personally test and verify on each model. Technicians requiring detailed service information would be well advised to purchase service manuals from the manufacturer.

ACCESSING DIAGNOSTIC MODES

GENERAL ELECTRIC

The G.E. CP-1000, CF-2000, CF-2500, CF-3000, CF-3500, and CF-4500 require a small jumper in the transceiver to access the diagnostic capabilities. With the cover removed and the audio board exposed, a small hole will be noted allowing access to the logic board underneath. The two pins visible through this hole must be jumpered (shorted) to activate the test functions.

SEND, 8, 3	Load synthesizer command

[illegible], 8, 5	Mute the received audio [default condition]

The test mode on the G.E. Mini and Mini II models does not require that the phone be opened to activate the diagnostics. Use the following sequence on the Mini:

Power up the phone and hold down the CL (clear) key. While holding CL, enter 1, 4, 1, 4, 2, 1, 3 within 8-10 seconds of powering up the phone. Release the CL key and the in use indicator will be illuminated.

The procedure is the same for the Mini II transceiver, except the END key is depressed while entering the digits instead of the CL key. The commands on both phones are:

x, x, x, END	Load synthesizer to channel xxx
x, x, x, x, END	Load synthesizer to channel xxxx [Mini II]
0, 3, SEND	Unmute the received audio
0, 4, SEND	Mute the received audio

NEC AMERICA

NEC models M-3700, M-4500, M-4600, and M-4700 can be placed in test mode by constructing a small adapter [illegible] male and female DB-15 [illegible] to place between the cable and the connector on the transceiver. The pins of the DB-15 connectors should be wired straight through (pin #1 to pin #1, etc.) except that pins #2 and #11 should be shorted (jumpered) to each other in addition to being wired through. This activates the test line present at the jack.

Power up the phone and enter RCL [illegible] the display should say "test mode." Key in 0, 1 and the message should be replaced by blocks on the display. Note that entering test mode will reset the phone's autonomous (cumulative) timer.

RCL, 0, 9, x, x, x	Load synthesizer to channel
next RCL, #, 1, 2	Unmute the received audio
RCL, #, 1, 1	Mute the received audio
RCL, #, 0, 2	Exit test mode

The NEC P-9000 and P-9100 series portable phones use a method similar to Motorola to access test mode: an extra battery terminal normally [illegible] only when a programming battery equipped with an additional contact is attached to the phone. Allegedly this [illegible] battery can be disabled by [illegible] the [illegible], black [illegible] the antenna connector while [illegible] regular battery. The phone and battery should be placed in its charger while using test mode. The above commands can then be entered.

NOVATEL

The following commands apply to the NovaTel 8300, 8301, 8305, and 8320 series phones. It is not known if they apply to other models in the 83XX series, as many of these phones are quite complicated, including commercial billing subroutines in the software for lease and rental applications. Exiting the test mode drops the phone into the billing mode. Depressing END exits the routine.

Power up the phone and lock it (FCN, Lock) so the display reads "LOCKED." Key in #, 8, 3 (or *, 8, 3, * on some versions of firmware) to access the service mode. The display will note "SVC" and [illegible] ing the model and revision codes.

Rather than use direct entry of test mode commands, this phone presents them as a service menu. The 'volume up' control steps forward through the items, and the 'volume down' scrolls through the selections backward. Scrolling through the [illegible] bring you to the "CHANNEL" [illegible] display. Keying in a cellular channel will load the synthesizer with that channel. CE clears [illegible] of an entry. [illegible] and RCL keys may [illegible] different [illegible]

The received audio [illegible] unmuted from the item "[illegible] or off" and pressing any numeral keypad will toggle the [illegible] off. The "VOLUME, GAIN x" [illegible] can be used to set the volume by [illegible] in a value from 0 to 7, with [illegible] loudest gain. The "SPEAKER [illegible] off" setting may also need [illegible] to produce audio output.

With the NovaTel PTR-80[illegible] PTR-825 cellular phones, [illegible] accessed by powering [illegible] keying FCN, FCN, *, 6, 4, 8, 2, *. Unfortunately, most of the diagnostic commands were not ready [illegible] our deadline. 1, 1, x, x, [illegible] is used to load the synthesizer to channel [illegible] #88# will re-initialize the [illegible] factory defaults, so use caution.

PANASONIC

Panasonic manufactures a [illegible] variety of phones. To identify [illegible] unit beyond what ever brand or [illegible] sumer model number may have been applied to it, you'll need to find the small tag on the transceiver that actually identifies the hardware.

The Panasonic EB-2501 and [illegible] transceivers require a jumper on [illegible] pass to enable access to the programming and diagnostic [illegible] you're willing to assume the risk, the [illegible]

MOTOROLA DIAGNOSTICS

The main portion of this article was limited to listing a few commands for a large number of mobile and portable phones. We'll take the opposite approach here, and present a detailed list of just about every test mode command available to the technician desiring to service transceivers manufactured by Motorola.

As a first step, one must identify the process required to place a given transceiver in the manual test mode. Regardless of Motorola's unfathomable model numbering system, most popular phones can be described as belonging to one of three groups which determines the access method to be employed.

Describing the physical style or class of the phone is far more productive than relying on the model number, mechanical serial number, or particular title bestowed upon a particular unit. What may be known as a Motorola "Wichita Cellular Classic" series, model 8006S in Kansas may be a "California Freedom" phone in the Golden State. House labels are the norm for carrier-marketed phones, and really has little bearing on the inherent diagnostics.

These cellular transceivers fall into one of these categories:

- Installed or transportable units
- Large handheld transceivers
- Small portables with a flip-down microphone panel

Installed phones are generally mounted inside the passenger compartment of a vehicle, and the same hardware when placed in a carrying case with a camcorder battery becomes a transportable unit commonly called a "bag phone." These transceivers are rectangular and come in both a 4" deep silver case, or a black metal case less than half that depth. Both versions have a male DB-25 connector at one end.

These units are placed in test mode by shorting the manual test line found at pin #21 to ground. Since the audio ground found on pin #20 is convenient, running a jumper between these two pins as depicted in Figure B is a convenient method of accessing the diagnostics. The best way to accomplish this and still be able to attach a cable to the connector is to wire a pair of DB-25 connectors straight through, and jumper these two pins. An RS-232 break-out box from Radio Shack (part #276-1403, $9.95) is quite convenient for constructing the adapter.

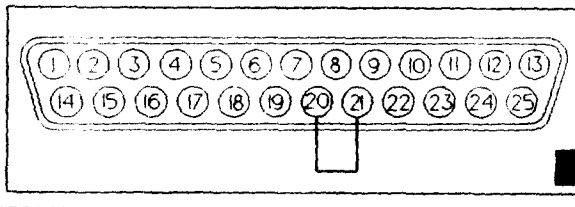

FIGURE B

Large handheld transceivers are commonly referred to as a "brick" phone because someone once compared using the original, bulky version to holding a brick to his head. Current models are much thinner and lighter, but the test line can be found in the same location on the back of the phone.

With the battery removed, 12 contacts are exposed on the upper portion of the phone, arranged in four groups of three terminals. The contact at the far right of the upper row is the test contact and is considered pin #6. A small wire jumper wedged against the side of this contact and grounded at the other end on the antenna connector shield (Photo 1) is an easy way to access the test mode. If the jumper is pushed flat against the back of the phone, the battery can be slid back on without dislodging the wire.

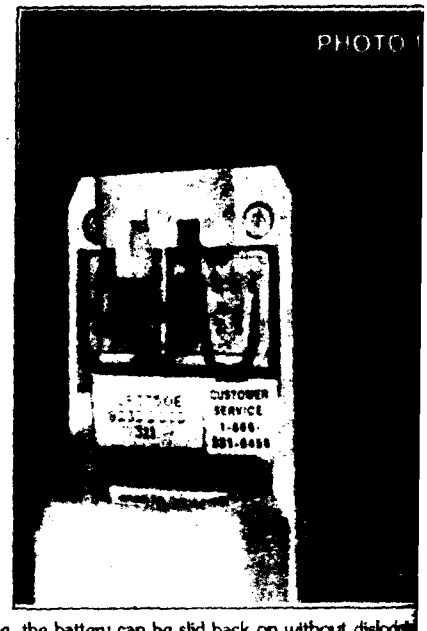

PHOTO 1

Motorola's small "personal communicator" series phones have been relegated to a category known as "flip phones" because of the flip-down microphone panel. The company officially refers to this as the "flipper" in several cellular service bulletins, perhaps as a tribute to the old television show about a dolphin.

The test mode contact on these units is located between the battery terminals in the lower right quadrant. Nestled in between the two power contacts is a recessed [illegible]